History and Philosophy of Modern Epidemiology

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The development of modern epidemiology is a case well suited for demonstrating the strengths of integrated history and philosophy of science. In the development of modern epidemiology, a major shift occurred in the middle of the 20 th century. Contrary to the infectious disease epidemiology, which had prevailed at the beginning of the 20 th century and which had focused on single agents causing individual diseases, the chronic disease epidemiology, which emerged at the end of Word War II, was a much more complex enterprise investigating a multiplicity of risk factors for each disease. Involved in this shift were such fundamental issues as the notion of causality, the scientific status of epidemiology, and the relation to biomedical and clinical research and to public health practice.

In this paper, I shall focus on some of the aspects in the development of modern epidemiology in which integrated historical and philosophical analyses seem especially helpful for gaining a full understanding of both the development of the discipline and of the situation today.

First, I shall give a brief overview of the historical background on which chronic disease epidemiology emerged and describe some of the social, scientific and health related issues involved in the pioneer studies of early chronic disease epidemiology, such as the studies of smoking and lung cancer or the early studies of diet and coronary artery disease. Next, I shall describe how the development from the monocausal enterprise of infectious disease epidemiology to the multicausal enterprise of chronic disease epidemiology gave rise to intense discussions of the possible criteria by which to establish causal relationships between a given factor and a particular disease. I shall show how the necessary and sufficient conditions expressed in the so-called Henle-Koch criteria that had proved useful for the 19 th century investigations of infectious diseases remained an ideal, although clearly an unobtainable one. Thus, 20 th century chronic disease epidemiologists were on the one hand searching for a new set of "general principles which would provide a logical framework for future investigations", on the other hand they admitted that they would have to accept something more "pragmatic". I shall analyze the various positions in this debate, including how they may connect to the disciplinary backgrounds of the pioneer epidemiologists that came either from medicine and public health or from statistics, mathematics and economy. I shall discuss the guidelines introduced by Bradford Hill in 1965, showing how they integrated most of the previous debate, and discuss how their later reception and current status as standard ingredients in most epidemiology textbooks, but as either clearly praised or equally clearly scorned, can only be fully understood on the background of this integrated historical and philosophical analysis of the development of epidemiology as such.

Finally, I shall discuss how epidemiologists' own view of epidemiology as a science was influenced by these philosophical debates on causality, by the contemporary developments of neighboring disciplines, and by the course and outcome of the major pioneer studies in chronic disease epidemiology and the practical needs of epidemiological research. As part of this discussion I shall briefly review some recent historical and philosophical accounts of the development and scientific status of modern

epidemiology and show the cogency of an integrated account. Thus, I shall argue that the development of modern epidemiology can only be fully understood by an integrated historical and philosophical approach. Philosophical issues such as epidemiologists' changing concepts of causality has to be understood in a historical setting that includes, among other things, the historical development both of disease patterns and of neighboring scientific disciplines as well as the development of epidemiological research methods. Similarly, the historical development of epidemiology has to be understood also on the background of philosophical issues such as the notions of causality, scientific methodology, the demarcation of science, and the relation between scientific disciplines.